<u>REMARKS</u>

Claims 1-6, 8-29 and 31-44 are pending in the subject application.

Claims 1-6, 8-29 and 31-44 stand rejected.

<u>Rejections under 35 U.S.C. § 103(a)</u>

In the Office's rejections of Claims 1-6, 8-29 and 31-44 under 35 U.S.C. §103(a),

it has become apparent that the Office is improperly motivated in crafting these

obviousness rejections through a hindsight application of teachings cherry-picked from

multiple references *(**up to as many as 6 references**)* to teach subject matter found only in

the instant application. In view of the lengths to which the Office has gone to add

multiple references together, it is apparent that Applicant has discovered a novel solution

to reducing noise components in a speech signal; it is troublesome, however, that the

Office utilizes pure hindsight to suggest that Applicant's claimed inventions are obvious

over the asserted combinations.

If the Office persists in maintaining these hindsight objections, Applicant requests

an in person interview with the Examiner's supervisor.

1.   <u>Claims 1-10, 19 and 22</u>

In paragraph 2 of the Action, Claims 1-10, 19 and 22 stand improperly rejected

under 35 U.S.C. §103(a) as being unpatentable by Johnson in view of Adlersberg and

Ashley. Applicant notes that Claim 7 was cancelled without prejudice in a previous

paper. It appears that the rejections are premised upon a misunderstanding of what the

references of record fairly teach. Applicant has, however, amended Claim 1 to clarify the

claimed subject matter. Applicant submits that the references, alone or in combination,

fail to establish a *prima facie* case of obviousness of the claimed subject matter of Claims 1-10, 19 and 22.

The Office admits that Johnson fails to teach (1) applying an estimated noise history to signal frames to compute a spectral gain function, and (2) detecting voice activity as a function of conditional comparisons of received Signal-to-Noise Ratios and average Signal-to-Noise Ratio thresholds. It is the Office, however, and neither Adlersburg or Ashley, that suggest (1) applying an estimated noise history to a signal frame or (2) detecting voice activity in a channel as a function of conditional comparisons of received signal-to-noise ratios and average signal-to-noise ratios.

A.   ***"applying an estimated noise history to signal frames to compute a spectral gain function"***

For example, the Office references Col. 2, lines 50-58 of Adlersburg to allegedly teach (1) applying an estimated noise history to signal frames to compute a spectral gain function. This portion of Adlersburg describes employing alternative algorithms to estimate noise for each frame of a signal. None of this portion nor any of Adlersburg describes ***<u>applying an estimated noise history to signal frames to compute a spectral gain function</u>***. To the contrary, Adlersburg merely describes a recursive estimation of noise signals. *See* Adlersburg, 5:18-28; 6:53-7:5 and Figs. 2C, 2D and 4.

Adlersburg discloses estimating whether a speech signal exists. Specifically, if speech exists, then no updating is performed; if speech does not exist, then an adaptive algorithm is performed by the noise estimator. (*see* 9:7-24) The adaptive algorithm performed by Adlersburg (if speech does not exist) is $B_k(n)=(1-a)B_k(n-1)+aN_k(n)$. $B_k(n)$

is the noise estimation of the current sample, a is a constant (0.1), $B_k(n-1)$ is the noise

estimation of a previous sample, and $N_k(n) = R_k(n)$ is the noisy signal. *See* 9:6-24. Upon

calculation of the noise estimate $B_k(n)$, this output is fed to a posteriori estimator and a

priori estimator. <u>Applicant cannot find any support in Adlersburg for *applying an*</u>

<u>*estimated noise history to signal frames to compute a spectral gain function.* Rather,</u>

<u>Adlersburg, at best, calculates a noise estimation as a function of the previous sample</u>

<u>(that is n -1).</u> Applicant respectfully requests that the Office reconsider its rejection

premised upon the teachings of Adlersburg or specifically point to evidence in

Adlersburg of its alleged teaching.

> B. ***detecting voice activity as a function of conditional comparisons of received Signal-to-Noise Ratios and average Signal-to-Noise Ratio thresholds***

While it appears that Ashley teaches detecting noise activity as a function of SNR

index values that exceed an index threshold (*see* 8:34-36), it is clear that the Office is

improperly motivated in making the suggestion that Ashley and Johnson can be

combined by a hindsight application of solely this teaching found in Ashley.

For example, Johnson teaches a VAD that utilizes flags, PDF and SDF, to define

the state of the data frame of samples. Depending upon the value of the respective flag,

"1" or "0", the frame will be defined as "Silence", "Primary Detect", "Speech" and

"Hangover". *Id.* at 7:28-47. For example, when PDF=0, then the state of the frame is

"Silence". When PDF=1 for three consecutive frames, then a state transition from

"Silence" to another state (i.e., speech, etc.) occurs. *Id.* at 7:57-8:39. See Figure 2.

Johnson then computes estimated noise energy as a function of an average noise value

(*Id.* at 8:46-65) and calculates gain values based on smoothed frequency components and

the state of the speech signal outputted from the VAD. *Id.* at 13:26-36. The estimated

noise energy is integrated with past values of noise energy to produce a spectrum of noise

in the frame. *Id.* at 14:1-21. There is no teaching in either Johnson, Adlersburg or

Ashley that Johnson's determination of noise estimation as a function of the state of the

speech signal (that is, as a function of a respective flag, "1" or "0", a frame will be

defined as "Silence", "Primary Detect", "Speech" and "Hangover") may be replaced by

Ashley's detection of noise activity as a function of SNR index values that exceed an

index threshold. The Office has not provided any teaching *in the references of record;*

rather, the Office provides an alleged motivation on page 6 of the Action that merely pays

lip service to the *Graham* factual inquiries. None of the Office's motivation finds

support in any of the references of record as discussed above, and the Office appears to

be of the opinion that because Johnson, Adlersburg and Ashley teach voice activity

detectors, any teaching in Ashley may necessarily take the place of a teaching in Johnson

to craft an obviousness rejection of Applicant's claimed subject matter. It is improper

hindsight to suggest that Applicant's claimed inventions are obvious over the asserted

combinations.

While Applicant has traversed the instant rejection, Applicant notes that the

references of record, including Ashley, are silent with regard to "detecting noise activity

in said channel as a function of conditional comparisons of at least one of historical voice

activity detection values, historical signal values and noise step values" as claimed in

Claim 1, as amended. Reconsideration and withdrawal of the rejection of Claim 1 is solicited.

C.   *computing SNR magnitudes of the signal frames*

The portion of Johnson cited for the teaching of SNR, Col. 1, lines 55-60, describes spectral subtraction and how spectral subtraction utilizes SNR to determine gain for a frequency component of a signal. The gain values computed in Johnson, however, are based on smoothed frequency components and the state output of the VAD. There is no need in Johnson for SNR and the Office's reliance upon Johnson in this instance is misplaced.

Claims 2-6, 8-10, 19 and 22, are dependent upon independent Claim 1. "If an independent claim is non-obvious under 35 U.S.C. § 103, then any claim depending therefrom is non-obvious." *See* MPEP 2143.03. Therefore, without addressing the additional patentable elements thereof, Applicant respectfully requests that the Office withdraw the § 103 rejection of Claims 2-6, 8-10, 19 and 22.

2.   <u>Claims 20, 21, 23-26 and 34-42</u>

In paragraph 3 of the Action, Claims 20, 21, 23-26 and 34-42 stand improperly rejected under 35 U.S.C. §103(a) as being unpatentable by 4 references, Johnson in view of Adlersberg, Sluijter and Ashley. While Applicant notes that this rejection again appears to cherry-pick elements from the references of record in a blatant hindsight rejection, Applicant has amended independent Claims 23 and 35 to include the element or similar element of identifying speech segments or detecting noise activity in a channel as

a function of conditional comparisons of at least one of historical voice activity detection values, historical signal values and noise step values. Incorporating the above discussion, none of the references of record render obvious all of the elements of independent Claims 23 and 35. Reconsideration and withdrawal of the rejection of independent Claims 23 and 35 are respectfully requested.

Claims 20-21, Claims 24-26, 34 and Claims 36-42 are dependent upon independent Claims 1, 28 and 35, respectively. Claims 1, 28 and 35 are in condition for allowance. By virtue of dependency alone and without addressing the additional patentable elements thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103 rejection of Claims 20-21, 24-26, 34 and 36-42.

3.   <u>Claim 27</u>

In paragraph 4 of the Action, Claim 27 stands improperly rejected under 35 U.S.C. §103(a) as being unpatentable by Johnson in view of Adlersberg, Hermansky and Ashley. Claim 27 is dependent upon independent Claim 23. Claim 23 is in condition for allowance. By virtue of dependency alone and without addressing the additional patentable elements thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103 rejection of Claim 27.

4.   <u>Claim 11</u>

In paragraph 5 of the Action, Claim 11 stands improperly rejected under 35 U.S.C. §103(a) as being unpatentable by Johnson in view of Adlersberg, Bizjak and Ashley. Claim 11 is dependent upon independent Claim 1. Claim 1 is in condition for allowance. By virtue of dependency alone and without addressing the additional patentable elements

thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103

rejection of Claim 11.

5.   <u>Claims 28-32</u>

In paragraph 6 of the Action, Claims 28-32 stand improperly rejected under 35

U.S.C. §103(a) as being unpatentable by Johnson in view of Adlersberg, Bizjak and

Ashley. This rejection also appears to cherry-pick elements from the references of record

in a blatant hindsight rejection, however, Applicant has amended independent Claim 28

to include the element of "said noise step detector detects and attacks a noise step

increase or decrease as a function of conditional comparisons of at least one of historical

voice activity detection values, historical signal values and noise step values."

Incorporating the discussion above, none of the references of record render obvious all of

the elements of independent Claim 28. Reconsideration and withdrawal of the rejection

of independent Claim 28 is respectfully requested.

Claims 29 and 31-32 are dependent upon independent Claim 28. Claim 30 was

cancelled without prejudice in a previous paper. Claim 28 is in condition for allowance.

By virtue of dependency alone and without addressing the additional patentable elements

thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103

rejection of Claims 29 and 31-32.

6.   <u>Claims 16-17</u>

In paragraph 7 of the Action, Claims 16 and 17 stand improperly rejected under 35

U.S.C. §103(a) as being unpatentable by 6 references: Johnson in view of Adlersberg,

Sluijter, Bizjak, Hermansky and Ashley. Claims 16 and 17 are dependent upon

independent Claim 1. Claim 1 is in condition for allowance. By virtue of dependency alone and without addressing the additional patentable elements thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103 rejection of Claims 16 and 17.

7.   <u>Claim 33</u>

In paragraph 8 of the Action, Claims 12-15, 18 and 33 stand improperly rejected under 35 U.S.C. §103(a) as being unpatentable by 5 references: Johnson in view of Adlersberg, Bizjak, Hermansky and Ashley. Claims 12-15, 18 and 33 are dependent upon independent Claims 1 and 28. Claims 1 and 28 are in condition for allowance. By virtue of dependency alone and without addressing the additional patentable elements thereof, Applicant respectfully requests that the Office reconsider and withdraw the § 103 rejection of Claim 12-15, 18 and 33.

Conclusion

Applicant submits that the present application is in condition for allowance.

Allowance of Claims 1-6, 8-29 and 31-44 is hereby requested.

If the Office persists in maintaining the obviousness rejections based upon 3, 4, 5 and 6 references, Applicant requests an in person interview with the Examiner's supervisor to address the Examiner's improper use of hindsight in maintaining a rejection of Applicant's invention.

If the Examiner believes that an in-person or telephonic interview with the Applicant's representatives will expedite the prosecution of the subject patent application, the Examiner is invited to contact the undersigned agents of record.

Should any additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of the same, such a petition is made and the Office is authorized to charge such fees to Deposit Account No. 04-1679.

Respectfully submitted,

_____/mcc/_____
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